

P. Pages : 2

Time : Three Hours



GUG/W/16/3790

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Answer questions 1 or 2, 3 or 4, 5 or 6, 7 or 8 and 9 or 10.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer wherever necessary with the help of neat sketches.

1. a) Discuss important physical & mechanical properties of Engineering Materials/metals. **8**
- b) Draw a schematic diagram for F.C.C. crystal structure and calculate packing efficiency for it. **8**

OR

2. a) Difference between metals & Non – metals. Also, calculate the total number of atoms per unit cell for: **8**
- i) B.C.C.
- ii) F.C.C.
- iii) H.C.P.
- b) Discuss classification of Imperfections in crystals and Explain their characteristics. **8**
3. a) Define solid solution. Name the types of solid solutions. Explain the factors which govern the formation of solid solution. **10**
- b) Discuss following with suitable example. **6**
- i) Alloy
- ii) Mechanical mixture

OR

4. a) Explain what do you mean by **8**
- i) Ingot structure
- ii) Dendritic solidification
- b) Discuss solidification of following: **8**
- i) Pure metal
- ii) Alloys
5. a) What is the utility of equilibrium diagram? Explain with the help of Isomorphous system. **8**
- b) Describe TTT diagram for 0.8% carbon steel. Define critical cooling rate. **8**

OR

6. a) Draw Fe – Fe₃ C equilibrium diagram showing following details: 8
 i) All critical temperature lines.
 ii) All phases present.
 iii) Different types of steels.
- b) What is hardenability? Explain Jomini End Quench test with sketch. 8
7. a) Explain characteristic features, properties and Applications of following: 9
 i) Hadfield manganese steel.
 ii) Maraging steel.
 iii) Spring steels.
- b) How are plain carbon steels are classified? State their applications. 7
- OR**
8. a) What are stainless steel? Give detailed classification of stainless steel. 7
 b) Explain in brief. 9
 i) Ball Bearing Steels
 ii) Spring Steels
 iii) Diamond Tools
9. a) What is Malleable Cast Iron? Explain production route of above cast Iron. 8
 b) Write short notes on: 8
 i) Phosphor Bronze
 ii) Gun Metals
- OR**
10. a) Write composition and use of following Non – Ferrous alloys: 4
 i) Muntz's Metal
 ii) Brasses
- b) Write down production route, composition, microstructure and application of grey cast iron. 6
- c) Write short notes on: 6
 i) Bronzes
 ii) Nodular cast iron
